

Westside Ditch Project Development Grant Application
August 15, 2008

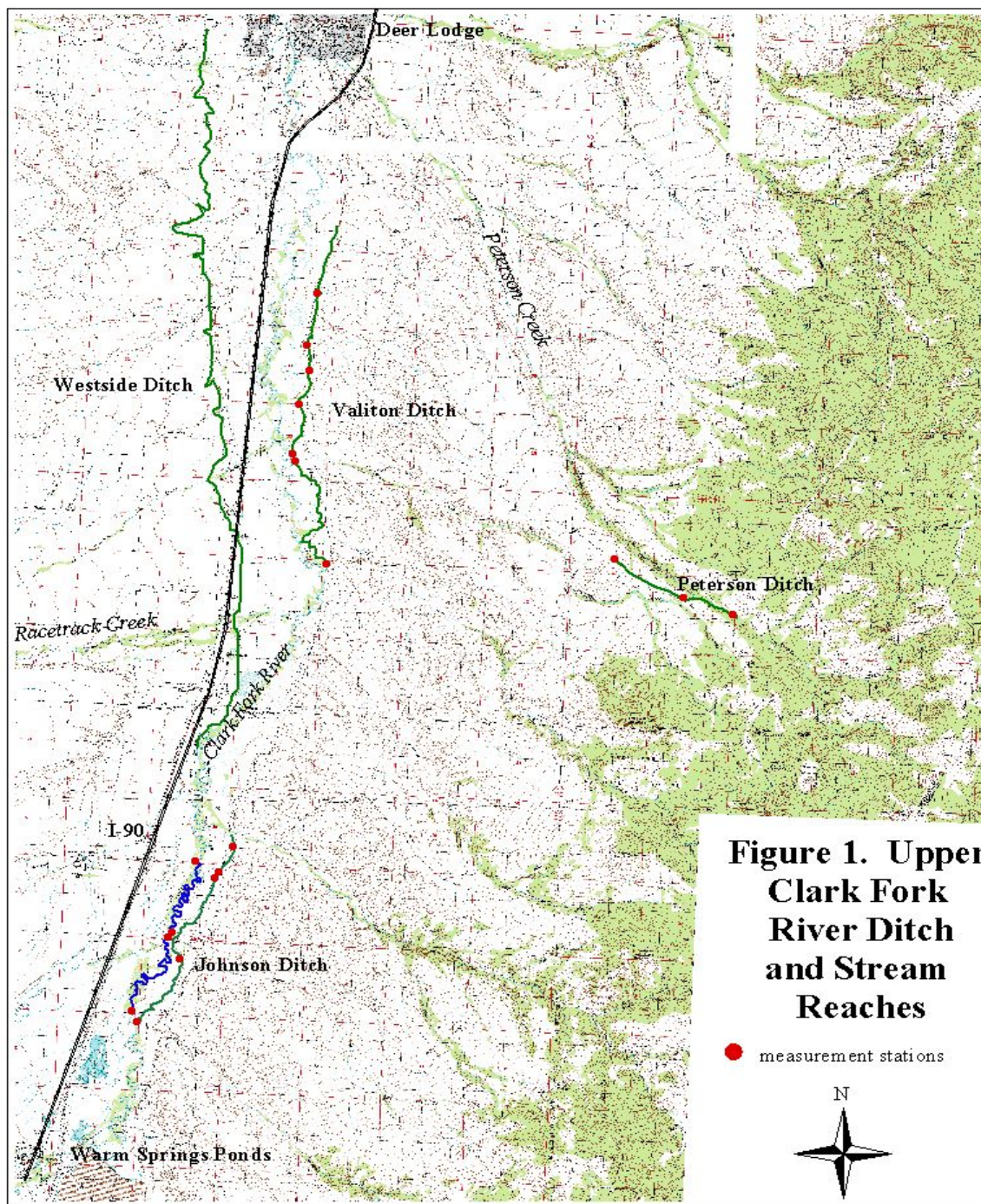
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Applicant Information and Project Summary Form

1. **Name of Applicant(s):** Westside Ditch Company and the Upper Clark Fork River Basin Steering Committee.
2. **Project Title:** Westside Ditch Project Development Grant.
3. **Type of Entities:** The Westside Ditch Company is a private company incorporated in the state of Montana and the Upper Clark Fork River Basin Steering Committee is a watershed group established by a state statute.
4. **Description of Project Location (Attach map showing location.):** As shown in Figure 1, the Westside Ditch conveys water approximately 12 miles between its headgate near the Racetrack interchange of Interstate 90 in the Deer Lodge Valley and the Grant Kohrs Ranch near Deer Lodge.
5. **Injured Natural Resource(s) and/or Impaired Services to be Restored, Rehabilitated, Replaced or Equivalent Acquired through Project:** The aquatic ecosystem and fishery in the Clark Fork River above Deer Lodge were damaged by the metals pollution from the over 100 years of mining and smelting activities in Butte and Anaconda. This project seeks to identify alternatives for increasing instream flow to enhance the fishery through water conveyance efficiency and/or water management and use changes associated with the Westside Ditch.
6. **Authorized Representative:** Rick Cline, Westside Ditch Company
Mailing Address: 1644 Greenhouse, Deer Lodge, MT 59722
Telephone: (406) 560-3018
Contact Person: Gerald Mueller, Facilitator, Upper Clark Fork River Basin Steering Committee
Mailing Address: P.O. Box 926, Philipsburg, MT 59858
Phone: (406)543-0026
E-mail Address: gmueller@montana.com

Figure 1 – Westside Ditch



7. Proposed Funding Sources:

2008 Application		Amount in (\$) Dollars					Matching Fund Percentage (Funding Source Total/Project Total)
Funding Source		Committed Funds		Uncommitted Funds	Total		
		Grants	Non-Grant Funds				
			Cash	In-kind			
A.	UCFRB Restoration Fund	\$ 25,000.00				\$ 25,000.00	100.00%
B.							
C.							
D.							
E.							
F.							
G.							
H.							
I.							
Non-NRDP Totals		\$ 25,000.00					0.00%

8. **Estimated Total Project Cost** \$25,000.00
 (Automatically Calculated from spreadsheet above)

9. Private (non-Governmental) Grant Applicant Financial Information

- Are there any lawsuits, judgments, or obligations pending for or against you? No.
- Have you ever declared bankruptcy? No.
- Are any of your tax returns delinquent or under dispute? No.
- Any unpaid deficiencies? No.
- Are you a party to a lawsuit? No.
- Do you have any other contingent liabilities? No.
- Do your current and deferred liabilities exceed the value of your assets? No.

10. Certification for Individuals or Public Entities

Certification for Individuals or Private Entities

I (We) the undersigned, have provided this financial information as part of my (our) application for a grant from the UCFRB Restoration Fund. I (We) certify that the statement is complete and accurate to the best of my (our) knowledge and I (we) authorize the State of Montana to investigate my credit worthiness and any of the matters described above.

Individual(s)

Name

Signature

Date

Private Entities

Name of Authorizing Agent

Federal Tax ID No.

Signature

Date

11. Authorizing Statement

Grant Authorization

I hereby declare that the information included in and all attachments to this application are true, complete, and accurate to the best of my knowledge, and that the proposed project complies with all applicable state, local, and federal laws and regulations.

I further declare that, for _____ (Project Sponsor), I am legally authorized to enter into a binding contract with the State of Montana to obtain funding if this application is approved. I understand that the Governor must authorize funding for this project.

Project Sponsor

Date

Authorized Representative (signature)

Title

Proposal Abstract

Applicant Name: Westside Ditch Company and Upper Clark Fork River Basin Steering Committee

Project Title: Westside Ditch Project Development Grant

This project will examine the structure and operation of the Westside Ditch to identify opportunities for increasing the flow of the Clark Fork River to enhance the fishery as a result of increasing ditch water conveyance efficiency, improvements in water management and/or changes to the use of water. Water leasing and/or changes to existing water rights will be considered to provide legal protection to the instream flow increases. The technical work will be conducted by Kirk Engineering and Natural Resources, Inc., Gateway Engineering & Surveying, Inc., Dennis Workman, and the Montana Water Trust. Westside Ditch Company will administer grant funds and ensure that grant reports are written.

Technical Narrative/Project Scope of Work

Background

The Westside Ditch diverts water from the upper Clark Fork River in the Deer Lodge Valley and conveys it about 12 miles between its headgate near the Racetrack Interstate 90 interchange and the Grant Kohrs Ranch near Deer Lodge. The distance to the first delivery point is 6.5 miles. The ditch is owned and operated by the Westside Ditch Company (WDC), which has seven members: George Reistad, 100 shares; Dan Bersanti, 50 shares; Ron Kelly, 45 shares; Rick Cline, 185 shares; Dick Forson, 100 shares; the City of Deer Lodge, 40 shares, and the National Park Service, 100 shares. WDC measured ditch seepage losses in 2001. Measurements were made at four locations on the ditch on and the results were reported in Department of Natural Resources and Conservation (DNRC) Report WR-3.C.2.UCF. According to this report, full ditch synoptic measurement runs conducted on June 22, 2001 and June 27, 2001 quantified losses of 18.8 and 19.4 cfs or 53% and 66% of ditch flows respectively.

The Montana Department of Fish, Wildlife and Parks (DFWP) maintains a list of streams in Montana that are chronically dewatered. The list is included in the *Upper Clark Fork River Basin Water Management Plan* published by the Upper Clark Fork River Basin Steering Committee (Steering Committee) in 1994. The mainstem of the upper Clark Fork River from Racetrack Creek to Rock Creek, some 92.7 miles, is on this list. In 1999, the Steering Committee contracted with Dennis Workman, the retired DFWP Region 1 Fisheries Manager, to classify the stream reaches in the upper Clark Fork River basin based on the frequency of dewatering and its potential effects on the fishery. Results of Workman's analysis are reported in *Upper Clark Fork River Flow Story (Flow Story)*, a 2006 report by the Steering Committee. Workman recommended three reaches of the upper Clark Fork River mainstem from Perkins Lane to the Little Blackfoot River confluence for immediate work to relieve the effects of dewatering. Of these three, the reach with the most severe dewatering was immediately below the Westside Ditch headgate. Regarding the Westside Ditch, the *Flow Story* concluded that:

Reducing seepage and evaporation losses on the order of 20 cfs through ditch lining and moving the point of diversion closer to the first delivery point appears to have the potential to increase mainstem flows significantly without reducing agricultural water use.

The Westside Ditch Company is interested in considering opportunities to reduce its diversions and increase mainstem river instream flows to benefit the fishery.

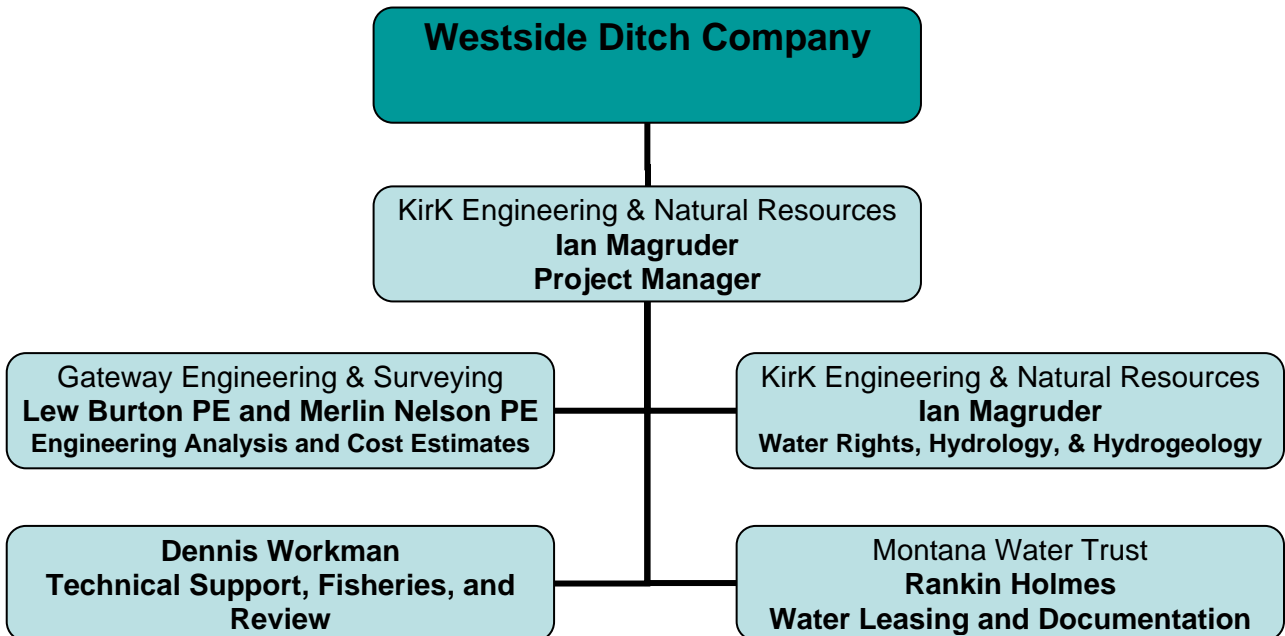
Project Goals and Objectives

The goal of this project is to identify opportunities for increasing the flow of the Clark Fork River to enhance the fishery as a result of increases to the Westside ditch water conveyance efficiency, improvements in water management, or changes to water use. To reach this goal, the project has three objectives or tasks: compile existing data, analyze Ditch Company water rights and the potential for enhancing instream flow, and analyze alternatives for enhancing the instream flow.

Project Personnel

The team that will conduct the technical work is shown in Figure 2 below. Resumes of the technical team are attached in Appendix 1. Specific work assignments are noted in the following section on the scope of work. The WDC secretary treasurer, will oversee receipt and payment of grant funds to contractors. WDC will also ensure that required reports are prepared and submitted.

Figure 2 – Project Technical Team



Scott Payne of Kirk Engineering & Natural Resources will provide overall quality control for the technical work.

Scope of Work

A narrative of the scope of work for this project for each of the three tasks follows.

Task 1: Compile Existing Data

Task 1 will review and compile a detailed summary of the existing ditch and other watershed data and, where appropriate, put the data into a GIS database for mapping purposes. This information and any previous design information, surveys, plans, specifications, etc., will be gathered for planning purposes and set up as a GIS project file. Ian Magruder will conduct Task 1.

Task 2: Analysis of Water Rights and Potential to Enhance Existing Flows

This task will tabulate, rank by priority date, and list the water rights and shares of water associated with the Westside Ditch. A comparison will be made of the water delivery to the actual acres irrigated with those acres claimed to be irrigated. A preliminary review of the ditch indicates that water rights total about 3,620 miner inches, about 90 cfs, and this amount of water is applied to irrigate about 2,500 acres. The historic irrigated acres versus more recent acres irrigated will be reviewed and documented along with any changes in water rights since 1973 to verify the potential amount of water available for water savings. The types of irrigation currently being used by each of the Westside Ditch Company share holder, e.g., flood, wheel lines, etc., will be noted and the areas of irrigation will be mapped.

As part of Task 2, water management will be studied to evaluate priority date enforcement, water delivery, planning for water shortages, if any, and how water is managed logistically in times of water shortages.

Also as a part of Task 2, the synoptic water measurements made on Westside ditch in 2001 will be tabulated and analyzed. The 2001 measurements were made at four sites: Little Modesty Flume, River Bridge, Racetrack Flume, and Dempsey Flume. Flow measurement for each of the site will be compiled and gaining and losses for each reach and each synoptic run evaluated as well as total gains or losses. Additionally, the data will be analyzed to determine which reaches would benefit from additional analysis to more clearly identify and isolate priority reaches for efficiency's improvements or and conveyance fixes.

Lastly, Task 2 will include an evaluation of water conservation, salvage, and use reduction for in-stream flow enhancement in the Clark Fork River. The amount of water that may be saved or used for other uses will be estimated together with the impacts, if any, to the agricultural land if water application or acres irrigated is changed. The ability to document and protect saved water instream to benefit the fishery and to move it down stream in the Clark Fork down river will be assessed. Existing data on the connection between surface and ground water will be examined to determine if more data are needed to assess whether water savings would have otherwise flowed into the river.

Ian Magruder will conduct Task 2.

Task 3: Analysis of Instream Flow Alternatives

Task 3 will combine the information and findings developed in Tasks 1 and 2 above to outline the options for enhancing stream flows (and potentially habitat) in the Clark Fork River and link these options to projects or improvements on the Westside Ditch or other nearby or related components associated with the Westside Ditch. The options will be prioritized and costs will be generated for those alternatives deemed acceptable by WDC. The engineering analysis and cost estimates of the alternatives will be conducted by Lew Burton PE and Merlin Nelson PE of

Gateway Engineering & Surveying. Dennis Workman will evaluate the alternatives from a fishery perspective and Rankin Holmes of the Montana Water Trust will address water leasing and related documentation as appropriate.

A cost analysis of alternatives and a cost comparison will be completed based on a present worth analysis. The best and most cost-effective alternative for stream flow enhancement will be determined and a recommended design and conservation strategy will be provided with the final selection/action approved by WDC.

Typical drawings with adequate detail for preliminary design level analysis will be developed for inclusion in a final technical report for use in subsequent grant and loan applications.

Final Product

The final product of this scope of work will be a report to provide the technical content of a grant application to implement a project to enhance Clark Fork River instream flow to enhance the fishery in a manner acceptable to WDC.

Timeline

The timeline for implementing the three tasks plus preparation of a final report for this grant is shown in Table 1. This timeline assumes that this project development grant is awarded by October 1, 2008. The final report for this grant will be prepared by February 15, 2009. This timeline would allow 45 days to prepare a grant application exceeding \$25,000 for submittal to the Natural Resources Damage Program by April 1, 2009.

Table 1 - Westside Ditch Project Timeline

Task	Oct 08	Nov 08	Dec 08	Jan 09	Feb 15, 09
1. Data review and GIS project					
2. Water Rights and in-stream flow analysis					
3. Alternatives analysis and technical summary					
4. Write final report					

Criteria Statements

1. Relationship of Expected Costs to Expected Benefits

The final product of this scope of work will be a report recommending a project to increase Clark Fork River instream flow to enhance the fishery in a manner acceptable to the Westside Ditch Company. This report is intended for use in developing a grant application submittal to the Natural Resources Damage Program by April 1, 2009.

Expected Costs

This project development grant application is submitted because of the uncertainty associated with the costs and, to a lesser extent, the benefits of proceeding to a specific action or actions to enhance instream flows in the Clark Fork River via the Westside Ditch. Several alternatives for supplying water for instream flow enhancement exist and will be evaluated by this project. They include: lining some portion of the ditch; moving the ditch point of diversion from the Clark Fork River nearer to the first point of use; modifying ditch flumes above Little Modesty Creek, Racetrack Creek, and/or Dempsey Creek or replacing them with underground structures; combining the Westside ditch with the Whalen ditch, portions of which run parallel only about 10 feet apart; installing moisture sensors to help manage irrigation; switching irrigation to center pivots; retiring irrigated lands from production; and initiating a drought plan. Some of these activities may require a change to existing water rights, and some a water lease. The cost of these alternatives would vary widely and would depend on the site specific conditions. Estimating their costs without these proposed analyses would be mere speculation.

Montana does not have a water bank that compiles and reports the costs of water right transactions. Comparable projects that enhance flows on the upper Clark Fork River apparently do not exist. ARCO has paid to acquire water stored in Silver Lake and for agricultural water rights to maintain flows in Warm Springs Creek. It is seeking to change existing water rights to instream flow in the Clark Fork, but the change of use process has not been completed. Because it involves stored water and a specific agreement with a local landowner, the cost of the ARCO's instream flow efforts is not likely to be directly transferable to the Westside ditch project. The Montana Water Trust has leased water for instream flow on a portion of the Little Blackfoot River. Again, because of specific local conditions, this lease cost would not likely be applicable to the Westside Ditch situation.

Expected Benefits

As stated above, the *Flow Story* identified the reach of the Clark Fork River immediately below the Westside Ditch headgate as the most dewatered stretch of the upper river mainstem and in need of immediate work to relieve the effects of dewatering on the fishery. The publication reported that in 2004 flows at Sager Lane, which is at the bottom of the Westside Ditch to Sager Lane reach of the Clark Fork River, dropped to 10 cfs or less during a four week period in mid-July. It also concluded that changes to the Westside Ditch may be a source of on the order of 20 cfs.

The Montana Department of Fish, Wildlife and Parks (DFWP) uses a technique known as the wetted perimeter inflection point methodology to assess the minimum and optimum flow needs of fish and aquatic life. The *Flow Story* contains DFWP's wetted perimeter results for the Galen and Deer Lodge gauges maintained by the United States Geological Survey. See Table 2. Galen is about 5 miles above the Westside Ditch head gate and Deer Lodge is on the order of 25 miles below it.

Table 2 - Wetted Perimeter Results

Location	Minimum Flow	Optimum Flow
Galen Gauge	40 cfs	Not Determined*
Deer Lodge Gauge	90 cfs	180 cfs

*Only one inflection point was identified.

These results show that a 20 cfs contribution to instream flow through a project on the Westside Ditch would provide one-half of the minimum flow for fish and aquatic life determined for a location just upstream of the ditch headgate, and potentially make a significant contribution to the minimum flow downstream at Deer Lodge. The actual benefit would depend on the amount and duration of the instream flows resulting from the specific alternative(s) selected as a result of this grant.

2. Cost Effectiveness

Two alternatives exist for accomplishing the purpose of this proposed project. One alternative is the present proposal which relies on the services of the project team including by Kirk Engineering and Natural Resources, Inc., Gateway Engineering & Surveying, Inc., Dennis Workman, and the Montana Water Trust. This team was selected by the Board of WDC through a limited solicitation in which three firms with experience and expertise were invited to submit a proposal to conduct the work. Two firms responded. NRD staff members were consulted about using a limited solicitation and its scope of work prior to issuing it. The present proposal and project team has the support of the WDC, which is a prerequisite for any work involving the ditch or the water uses it provides. It also addresses both water rights and actual changes to the ditch or its use; both must be considered to ensure enhancement of instream flows. A second alternative would involve a different entity or entities to pursue the project purpose. Without identifying the different entity, whether or not its work would have the necessary support of the WDC is not known. A third alternative is no action, but it forgo identifying an alternative for use of Westside Ditch water to increase instream flows to enhance the fishery in the most heavily dewatered stretch of the upper Clark Fork River.

3. Impacts to the Environment and Human Health and Safety

This project would have only positive impacts on the natural and human environment by increasing instream flows in the most heavily dewatered reach of the upper Clark Fork River in a manner acceptable to the irrigators who now depend on the Westside Ditch. As explained above, DFWP analyses indicate that additional instream flow provided may have a significant benefit on the fish and aquatic life in the upper Clark Fork River, depending on the amount and durations of the flows provided.

4. Public Support

This project was approved by the company owning the Westside Ditch and the Steering Committee. By statute, 85-2-338 MCA, Steering Committee members are selected to be broadly representative of the basin water interests.

5. Public Access

Public access is not relevant to this proposal because its purpose is for a project development

grant.

Proposal Budget

See Table 3.

The budget contains a 5% charge to WDC for administering the grant including receiving and paying out the grant funds to the contractor and ensuring that required reports are prepared and submitted.

Insert budget spread sheet.

References

Upper Clark Fork River Ditch Efficiency Assessment, Montana Department of Natural Resources and Conservation Report WR-3.C.2UCF by Mike Roberts, January 2002.

Upper Clark Fork River Basin Water Management Plan, prepared by the Upper Clark Fork River Basin Steering Committee, December 1994.

Upper Clark Fork River Flow Story, prepared by the Upper Clark Fork River Basin Steering Committee, August 2006.

Unpublished Westside Ditch flow data measured by WDC in June, July, August, and September 2001.

RESUMES

SCOTT M. PAYNE, R.G.

Kirk Engineering & Natural Resources, Inc.

P.O. Box 636

Sheridan, MT 59749-0636

406-842-7224(voice) & (406) 842-7230 (fax)

scott_payne@kirkenr.com

TECHNICAL SPECIALTIES

Hydrogeology / hydrology

Natural Resource Planning

Groundwater flow & solute transport modeling

Soil and water science

Field sampling, analysis & plan development

Water and soil restoration

ESA/report/work plan preparation

INDUSTRY EXPERTISE

CERCLA/Superfund & RCRA

NEPA / MEPA documentation

TMDL / CWA compliance

Expert witness & disclosure

Regulatory support/negotiation

Water rights

Grants & public presentations

GENERAL EXPERIENCE

Mr. Payne has over 20 years of experience as a professional hydrogeologist, environmental consultant, and watershed expert. He has extensive planning, project management, communication, NEPA Environmental Assessment / Environmental Impact Study preparation, and watershed management experience. He has extensive experience in Superfund assessments, TMDL development, evaluating / monitoring physical and chemical conditions associated with surface water, groundwater and aquifer systems, interpreting surface and groundwater chemistry, evaluating water supplies for agriculture, industry and municipalities, water rights, preparing / reviewing grant applications, and conducting analytical and numerical groundwater flow and solute transport modeling. Other experience includes expert witness and litigation support, remediating contaminated soil through land farming and soil vapor extraction; evaluating water treatment and disposal systems; reservoir rehabilitation assessment; overseeing activities completed at CERCLA sites and RCRA facilities; and conducting document reviews. Mr. Payne has installed over two hundred monitoring wells and is the author of numerous environmental documents, work plans, papers, and reports.

Mr. Payne gained his watershed experience working for several prominent watershed groups in Western Montana including the Flathead Basin Commission, Beaverhead Watershed Committee, Blackfoot Challenge, Watershed Restoration Coalition of the Upper Clark Fork, and the Ruby Watershed Council. In the last five years, Mr. Payne has lead critical watershed assessment and planning efforts for four Montana TMDL planning basins on over 100 listed waterbodies, assessed the chemical, physical, and biological resources in numerous watersheds, characterized nonpoint source pollution and causal linkages, and has lead/prepared several watershed restoration plans. Mr. Payne is currently participating in Montana reservoir rehabilitation assessment projects located on Caribou Creek and Douglas Creek, both of which are tributaries to the Clark Fork River.

Mr. Payne gained his hazardous waste management experience through work conducted for the U.S. Navy in central California. Mr. Payne previously served as the program manager

for environmental activities at the Fleet Industrial Supply Center, Oakland, California, under the Comprehensive Long-term Environmental Action Navy (CLEAN) Contract. Mr. Payne has also worked on dozens of other CERCLA and RCRA facilities across the western US.

Mr. Payne is the author of *Strategies for Accelerating Cleanup at Toxic Waste Sites* published internationally by Lewis Publishers of New York. In Mr. Payne's book, he outlines streamlining regulatory processes, effectively negotiating decisions and actions, identifying win-win solutions, instilling environmental leadership, and applying practical solutions to environmental problems.

Mr. Payne's technical experience includes developing / implementing TMDL water quality restoration plans under the CWA, developing nonpoint source implementation plans, completing site inspections, conducting remedial investigations, feasibility studies and remedial design studies, planning and conducting removal actions, preparing decision documents, conducting water resource and baseline investigations, and conducting numerous soil and water field investigations. Mr. Payne has reviewed and completed many complex groundwater flow and solute models, completed soil remediation projects, completed environmental site assessments, and completed non-degradation analyses for nutrient loading and metals.

Mr. Payne gained his NEPA/MEPA experience working for a variety of clients. For the Montana Department of Natural Resources and Conservation, Mr. Payne worked with the program staff and a team of consultants to evaluate the 1998, 2000, and 2002 Renewable Resource Grant Program applications and also Reclamation and Development Grant Program. Mr. Payne's efforts primarily involved reviewing applications and conducting the appropriate environmental evaluations for alternative and impact analysis. Results of Mr. Payne's efforts were finalized by the DNRC for approval by the Montana legislature. Mr. Payne was also the project hydrogeologist for an EIS that evaluated the environmental impacts of realigning the Yellowstone Pipeline from Missoula Montana to Kellogg Idaho. This large, controversial, and extremely complex project involved serious potential environmental consequences related to gasoline leaks in project area aquifers. The complex analysis involved all components of an EIS, and groundwater issues were one of the primary review concerns. Other efforts include EA preparation for the FSA (in progress) for a \$40,000,000 CREP application aimed at the riparian corridor in the Upper Clark Fork River Basin. This is key conservation effort related to ongoing agricultural BMPs the Watershed Restoration Coalition of the Upper Clark Fork is spearheading.

SELECTED PROJECTS AND EXPERIENCE

- For the Flathead Basin Commission (FBC), Mr. Payne served as the technical service provider for the Voluntary Nutrient Reduction Strategy (VNRS). His efforts focused on implementing activities and programs that improve water quality and move toward meeting the TMDL target levels for Flathead Lake. These efforts often involved promotion of stewardship practices and BMPs. Nonpoint sources of nutrients were shown to enter streams

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and Flathead Lake and have increased nitrogen and phosphorus concentrations in Flathead Lake, degrading water quality and causing alga blooms oxygen deficiencies in

some areas. Mr. Payne's efforts were aimed at providing technical support to local watershed groups, TMDL development, and minimizing non-point sources of nutrients in the watershed through community voluntary actions and education. Example efforts include community outreach and education programs, identification/preparation of grants and specialty programs that fund on-the-ground actions related to the TMDL effort, and information transfer for regulatory and technical information related to BMPs. Areas of focus included residential land use/septic systems, forestry, agriculture, abandoned mines, air quality, recreation, and other non-point sources of water pollution. Mr. Payne has been successful in writing grants under the VNRS totaling over \$1,750,000.

- For the Montana Department of Natural Resources and Conservation, Mr. Payne worked with the program staff and a team of consultants. The goal of the effort was to evaluate the 1998 and 2000 Renewable Resource Grant Program applications. Mr. Payne's efforts primarily involved reviewing applications related to groundwater and surface water studies. Results of Mr. Payne's efforts were finalized by the DNRC for approval by the Montana legislature.
- For the Montana Department of Natural Resources and Conservation, Mr. Payne was responsible for leading a diverse team of experts collaborating on preparing the Flathead Lake TMDL using target nutrient load levels established by the Flathead Basin Commission (FBC) in 1998. In addition, he developed an implementation strategy to reduce the amount of nutrients entering Flathead Lake. The draft document was revised by the MDEQ and has since been approved by the EPA. The FBC is the principle lead for implementing the TMDL through the Voluntary Nutrient Reduction Strategy (VNRS). Mr. Payne provides the VNRS coordinator services and he is the primary technical person responsible for Flathead Lake nutrient reduction projects.
- Mr. Payne has served as the technical service provider for the Watershed Restoration Coalition of the Upper Clark Fork (WRC) and was responsible for planning, developing and funding watershed projects needed to protect and enhance basin natural resources. Also, he provided TMDL development support for WRC projects. Past mining and smelting operations have impacted landowners and the WRC is pursuing a variety of funding programs to restore impacted lands using Natural Resource Damage Program (NRDP). Example projects include off-stream water for stock, cross fencing and prescribed grazing, wetland conservation, critical planting, channel reconstruction, and irrigation projects.
- Mr. Payne was the Blackfoot Challenge project manager for phase I and II of the headwaters project. Scott oversaw contractors compiling the physical, chemical, and biologic data for the headwaters project needed to verify impairment issues and

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evaluate nonpoint pollution sources. The source assessment is primarily a modeling effort that takes into account the natural setting (e.g., soils, slope, etc.) and anthropogenic and natural condition that affect metals, nutrients, sediments, and siltation. This is an ongoing process that is aimed to address water quality issues in the Headwaters area in 2002 and in the middle Blackfoot in 2003.

- For the Citizens Technical Environmental Committee (CTEC), Mr. Payne provides CTEC technical oversight under an EPA grant for services related to the Butte Superfund sites. Scott's main responsibility is to review technical documents on behalf of citizens and help steer the Superfund decision process and ensure local concerns are being met. Scott is currently focused on groundwater flow and quality issues in the Butte area and has help steer the EPA and ARCO into looking at improved ways to cleanup and protect groundwater. Scott also provides education services to the Butte Community promoting understanding of the watershed conditions and how historic mine related activities have impacted the area natural resources.
- Mr. Payne provides technical services to the Ruby Watershed Council. The list of streams identified as impaired on the 1996 303(d) list under MDEQ's TMDL program is a sensitive issue for local residents and stakeholders on the watershed groups. This project involves the Ruby Watershed Council and Ruby Conservation District efforts to reassess the list of impaired streams in the Ruby Valley. Mr. Payne is working directly with the Ruby Watershed Council and the RVCD supervisors to complete a comprehensive watershed assessment by evaluating the chemical, physical, and biological resources of the watershed. In the end, a watershed restoration plan and targets will be developed for implementation of BMPs and resource conservation. He also prepared a comprehensive groundwater management plan for the 300,000-acre lower Ruby Valley. He studied the relationship between groundwater and surface water interaction and developed a set of recommendations to protect water resources.
- Mr. Payne was project manager and hydrogeologist on a comprehensive baseline investigation for a formally proposed gold mine located near Yellowstone National Park and the Beartooth - Absaroka Wilderness. The project, located in an extremely environmentally sensitive area, is surrounded by wilderness and national parkland. The project involved collecting data for baseline studies, including water resources, cultural resources, wildlife, vegetation, aquatic biology, soils, noise, and visual resources. The baseline studies were presented with the facility design and mine permit application to the Montana Department of State Lands and the U.S. Forest Service for review. Mr. Payne prepared the water resources baseline study. The proposed gold mine design included a cyanide flotation process and tailings impoundment. Mr. Payne's responsibilities included collecting water resources data from monitoring wells, surface water sites, and springs; evaluating baseline water quality data; and evaluating potential impacts from mine discharge. Mr. Payne also coordinated the other baseline studies, and helped prepare the mine permit

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application. In addition, he evaluated groundwater inflow into the proposed open pits and under ground mine workings and evaluated impacts of the historic mining activities in the project area. Mr. Payne also evaluated mine water disposal using land application and oversaw validation of over 50,000 water quality data collected. Data collection for the project required Mr. Payne and the field operatives to collect field data in often adverse weather conditions. The project ranges in elevation from 9,000 feet to over 10,000 feet and on the average has only 27 frost free days per year, with snow depths of 8 to 15 feet.

These alpine conditions, and the need for accurate water resource data, required Mr. Payne to provide additional field coordination to cope with the extreme field conditions.

- Mr. Payne recently served as an expert Hydrogeologist for the U.S. Army in a prestigious capacity. Mr. Payne was a team member of the Army's Independent Technical Review Team (ITRT) whose job was to review the current technical status of several west coast Army installations undergoing environmental cleanup and also to meet with installation project teams to make recommendations that fast-track the environmental restoration process. Each ITRT member was from a different part of the nation and had specific expertise need for the project. Together, the team has expertise that covers the major disciplines typically needed to complete environmental restoration projects. Mr. Payne focused his review efforts on installation hydrogeology, and also streamlining recommendations and cost saving opportunities that are described in his book.
- For a private client, Mr. Payne reviewed a MODFLOW groundwater flow and a BIO1D solute transport model for the BN Paradise Superfund site. A groundwater control zone proposed for the site and downgradient area, and Mr. Payne reviewed the proposal for completeness and technical merit on how it would affect adjacent properties. Mr. Payne prepared general and specific technical comments on the proponent proposal for consideration by the DNRC review team.
- Mr. Payne was the project hydrogeologist for a site in Bozeman, Montana and an expert witness for the project. The site was under Interim Order by the State of Montana to evaluate the contents and soil surrounding a 6000-gallon septic system, which was thought to have been the potential source of tetrachloroethylene groundwater contamination detected in residential wells in the area. Mr. Payne was involved with developing removal actions to clean up the septic system area; removing contaminated sludge and a septic tank; helping install an SVE system; sampling soil and groundwater, shipment and incineration of hazardous waste removed from a septic tank; preparing cursory numerical and analytical models for groundwater flow, solute transport, and an irrigation study; and conducting various field operations. Mr. Payne also was involved with communicating with personnel from the Montana Department of Environmental Quality (DEQ) on the project. Currently, Mr. Payne has served as factual and expert witness for the Bozeman Solvent Site, providing expert disclosure and rebuttal statements for the project.

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- For the highly publicized Air Force A-10 recovery project, Mr. Payne was the interim project manager and on-site field team leader. This job consisted of recovering plane wreckage, UXO, and human remains in a steep alpine setting. The wreckage was located on Gold Dust Peak at an elevation between about 12,000 to 13,300 feet. Field efforts included setting ropes for safety, using crampons and ice axes for high elevation travel, and working in a mountainous and snow covered environment. Mr. Payne has extensive mountaineering and climbing experience, which were essential for leading cleanup teams while on site. Mr. Payne used his project management skills to lead the project at the base station, located in Eagle, Colorado, when he served as the interim project manager. A helicopter service was used on a daily basis for transporting teams up to and from the

crash zone, and also to long haul plane wreckage back to the Eagle airport. Mr. Payne helped develop the strategy for conducting geophysics at the crash site to look for UXO in the area snowfields, which included use of GPR and electromagnetic induction equipment. This project required working in dangerous conditions, at high elevation, and often under adverse weather conditions. A base camp at high elevation was setup, and used on occasion used, for periods when flying was unsafe.

- Under the CLEAN contract, Mr. Payne was responsible for all CERCLA (Installation Restoration Program), Base Realignment and Closure (BRAC), and pollution abatement activities at Fleet Industrial Supply Center, Oakland (FISCO). Mr. Payne's responsibilities included program management, preparing reports, conducting site inspections and remedial investigations, evaluating the base storm drain system, removing 20 USTs, providing support to accelerate a lease transfer of property to the Port of Oakland under BRAC, conducting numerous time critical and emergency removal actions, and preparing records of decision. As part of the BRAC process, Mr. Payne was responsible for preparation of a base wide environmental baseline survey (EBS), BRAC Cleanup Plan, and Finding of Suitability to Lease (FOSL) documents. Previous preliminary assessments (PA) completed at the facility identified a total of 25 IRP sites. As part of the project, Mr. Payne classified these sites as either no action sites, expanded site investigation sites, or remedial investigation sites based on the data gathered to date. Mr. Payne implemented an accelerated cleanup approach that was successful in quickly reducing risk to human health and the environment. The tank removal operations of 20 USTs included an extensive soil and groundwater-sampling program to help identify contaminated areas at the facility and propose cleanup alternatives. More recently, Mr. Payne has served as an in house consultant for this project, addressing regulatory and technical issues.
- For the Navy at the Point Molate fuel depot located near Richmond, California, Mr. Payne prepared a numerical groundwater flow model to estimate groundwater pumping rates for a pump and treat system constructed within a slurry wall. Mr. Payne efforts were used to help select the proper pump size and well placement at the site to recover floating and dissolved petroleum contamination.

Scott Payne - KirK Engineering & Natural Resources, Inc.

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- Mr. Payne has provided the U.S. Environmental Protection Agency (EPA) oversight support on numerous jobs. Oversight for the EPA varies from reviewing sampling and analysis reports, RI/FS documents, RD/RA documents, to reviewing large modeling reports prepared by consultants. As part of Mr. Payne's oversight work, he has prepared numerical groundwater flow models to validate work being reviewed and proposed ways to accelerate action at sites to streamline protection of human health and the environment. Also for the EPA, Mr. Payne has worked on cost estimates for the Superfund Innovative Technologies Evaluation (SITE) program.
- Mr. Payne has served as the as the technical lead on several abandoned mine project for the MDEQ. For these projects, he characterized bedrock and unconsolidated water bearing systems, underground mine hydraulics, site chemistry conditions, and provided an evaluation of reclamation alternatives. Mr. Payne has authored several reports for the

MDEQ's abandoned mine program. Example project sites include the Alta Mine and Bullion Mine sites. Mr. Payne is very familiar with the State of Montana's abandoned mine efforts from both a technical and regulatory perspective.

- Mr. Payne was the project hydrogeologist for a water resource job in East Helena, Montana. As part of the job, Mr. Payne's reviewed the local hydrogeologic conditions for locating a water supply well for a growing subdivision. Mr. Payne identified a preferred alternative for locating a production well, along with several other alternatives that would yield sufficient water to meet the subdivision's needs. A 10-inch 500-foot deep production well was installed at the preferred site and was completed with stainless steel screen and a submersible pump. The well is estimated to produce about 700 gallons per minute of water. Mr. Payne helped with conducting a long-term aquifer test on the well. Currently, the new production well provides a large percentage of the subdivision water supply needs.
- Mr. Payne was the project hydrogeologist for an operating gold mine, located near Whitehall, Montana. Mr. Payne was involved with evaluating potential leakage from a tailing impoundment containing cyanidated tails, evaluating an operating groundwater pump back system, evaluating water quality impacts resulting from a proposed mine expansion, providing support for an extensive water balance in an open pit, evaluating water treatment alternatives for perpetual treatment of mine waters containing metals, and collecting baseline data for a mine expansion. He was also responsible for reviewing all project data, evaluating cyanide movement in the aquifer system beneath the tailing impoundment, evaluating water treatment costs, and assessing groundwater inflow into an open pit. Mr. Payne also served as a reviewer of the engineering design, from a hydrology perspective, for a new tailing impoundment recently constructed.
- Mr. Payne served as project manager for a water resource baseline study for a proposed gold mine located near Townsend, Montana. He was responsible for monitoring well installation, aquifer testing, water quality sampling, project

scheduling, and budget review. As project manager, Mr. Payne reviewed the water quality database and prepared a water resource baseline report.

- As part of a talc mine water supply project, located near Ennis, Montana, Mr. Payne conducted a groundwater resource investigation. Through installation of several test wells, Mr. Payne identified a high yield groundwater supply in a shallow Precambrian bedrock aquifer. Mr. Payne's project involvement included preparing the mine's water rights application, evaluating groundwater movement, and determining groundwater yield from the shallow alluvial aquifer and the Precambrian bedrock aquifer system. The project was completed after Mr. Payne designed and installed a high yield 10-inch diameter production well that included an 8-inch diameter stainless steel well screen and submersible pump.
- On another water resource project, Mr. Payne was the project lead for preparing a water reservation for the City of Helena. Mr. Payne and the supporting staff were successful in helping the City of Helena receive an approved water reservation from the State of Montana, which was evaluated by the City of Helena as a future water supply for the City residents. Mr. Payne has provided technical input while working the City's consultant related to drilling, aquifer testing, and overdraft issues related to the water reservation testing currently underway.
- On a water resource job in Colestrip, Montana, Mr. Payne was responsible for drilling and logging two 8-inch water supply wells 1200 feet and 1500 feet below ground surface to supply an electrical generation plant with cooling water. As part of the job, Mr. Payne supervised down-hole geophysics data collection, reviewed the geophysical results, helped identify screen intervals for the water production, and worked with the project manager to install submersible pumps in the wells.
- Mr. Payne served as project hydrogeologist for a water resource project in Sweetgrass, Montana, located on the U.S. and Canadian border. Mr. Payne conducted a hydrogeologic assessment of groundwater conditions near the city of Sweetgrass to evaluate the groundwater supply alternatives. As part of the project, Mr. Payne conducted a high yield aquifer test in the underlying bedrock formations. The aquifer test results will be used to prepare the necessary water right applications, design a storage and supply system for the city of Sweetgrass, and replace or expand the existing Canadian water supply.
- Mr. Payne's modeling experience includes an extensive computer groundwater flow and solute transport model for a lead smelter Superfund site, located in East Helena, Montana. Previous studies identified a large arsenic plume in the shallow alluvial aquifer system, moving down gradient of the plant site, ranging in concentration from over 200 milligrams/liter (mg/L) in the plant site area to 0.005 mg/L approximately 1 mile away from the plant. Mr. Payne was responsible for simulating groundwater flow conditions and surface water interaction over a 6-square mile area. In addition, he used the simulated groundwater flow field to

predict arsenic concentrations and transport over a 500-year period. As part of validating the groundwater flow model, Mr. Payne simulated aquifer tests conducted at the site. Mr. Payne also completed a statistical analysis of the modeled results to evaluate the validity of the groundwater flow model. As part of remedial design, Mr. Payne conducted additional computer modeling that included simulating drawdown from proposed recovery wells installed at the plant site and resultant arsenic recovery. Ongoing activities at this site include soil cleanup operations and water treatment testing.

- As part of a leaking underground storage tank (UST) project for the Helena Valley Irrigation District, Mr. Payne was responsible for sampling volatile organic compounds (VOCs) in domestic wells, determining transport of the VOCs in an alluvial aquifer system, and installing deep replacement wells at homes affected by the VOCs. As part of the project, Mr. Payne helped design dual steel wall replacement wells that were drilled through the contaminated upper aquifer zone into deeper uncontaminated portions of the aquifer system. Mr. Payne also helped evaluate remedial alternatives for the project, including the installation of an SVE system.
- The City of Helena requested Mr. Payne to evaluate the hydrogeologic conditions at the city golf course to determine if there is available groundwater to sustain a high yield production well for irrigation use. As part of the project, Mr. Payne was requested to determine whether or not the proposed production well would affect nearby water rights. To evaluate the golf course groundwater system and nearby water rights, Mr. Payne installed an 8-inch diameter test well and conducted a long term, high yield aquifer test to stress the aquifer system. As part of the analysis, Mr. Payne measured water levels from several other test wells installed at the golf course and water levels from domestic wells that potentially would be affected by the proposed production well. Results of the analyses were provided to the Montana Department of Natural Resources and Conservation. The results indicated the golf course aquifer system was limited in extent. It also was indicated, however, that the aquifer system is able to yield substantial flow rates for relatively long time periods without excessive drawdown. More recently, Mr. Payne was requested to do additional water resource evaluation work at the golf course due to increasing the size of the golf course from 9 holes to 18 holes. Mr. Payne proposed several alternatives for the City to resolve increased water production needs at the golf course, including drilling a high yield production well on a near by property.
- Mr. Payne was responsible for monitoring well installation, groundwater sampling, and soil testing at an industrial site in Los Angeles, California. Mr. Payne helped conduct an extensive soil cleanup operation to remove lead-contaminated soil from the site and haul it to a hazardous waste depository. In addition to removing lead-contaminated soil, Mr. Payne was involved with identifying gasoline and methyl-ethyl-ketone, and other VOC contamination in the shallow groundwater system, beneath the industrial site.

- Mr. Payne's graduate studies at the University of Montana included a research assistant position. The research assistant position consisted of computer modeling steady state and transient groundwater flow and solute transport of brines from an oil well reserve pit in

eastern Montana. Mr. Payne used the PLASM 2-D groundwater flow and the Random Walk solute transport computer model for his work. Other work included deployment of electrical geophysics including electromagnetic induction (EM) and surface resistivity; installation of lysimeters and monitoring wells; water quality sampling; aquifer testing; development of a water quality database; and writing reports.

- As a research specialist for the University of Montana, Mr. Payne's responsibilities included mapping a shallow perched aquifer system to determine the expansion potential of a groundwater supply at the University of Montana Forestry Experiment Station. This included use of EM and surface resistivity geophysics to map aquifer heterogeneity and aquifer thickness, installation of monitoring wells to confirm the geophysics data, and aquifer testing to determine aquifer characteristics.

EMPLOYMENT HISTORY

KirK Environmental LLC, 1998 - Present (business owner)

Tetra Tech EM Inc., Senior Hydrogeologist/Program Manager, 1991 - 1998

Hydrometrics, Hydrogeologist, 1988 - 1991

University of Montana, Research Assistant/Teaching Assistant, 1987 - 1988

Environmental Solutions, Hydrogeologist, 1985 – 1986

EDUCATION

M.S., Geology with a Hydrogeology Emphasis, University of Montana, 1989

B.S., Earth Science, Northland College, 1985

Mr. Payne is currently a Ph.D. candidate at the University of Montana Geology Department

Riparian Proper Function Condition, NRCS Training, 2001 and 2002

PROFESSIONAL CREDENTIALS, AFFILIATIONS, AND COMMUNITY SERVICE

Professional Geologist, Wyoming, PG-1676, 1993 - present

Registered Geologist, California, RG-6199, 1995 - present

AWRA member 1998 - present

Sheridan Volunteer Fire Department, 1999 - present

PUBLICATIONS AND PRESENTATIONS

Donohue, D.A., Huffsmith, R.L., Payne, S.M., 1994, Identification of a High Yield Aquifer Deep in the Helena Valley, West-Central Montana. October 13 and 14 AWRA Conference, Missoula, Montana.

Payne, S.M., 1988, Modeling of Hydrogeologic Conditions and Groundwater Quality Near an Oil Well Reserve Pit in Richland County, Montana. Montana Bureau of Mines and Geology Open File Report.

Payne, S.M., 1993, Implementing Preremedial Investigation Cleanup on Large Multiple-Site Projects. Proceedings from the 74th Annual American Association for the Advancement of Science, Pacific Division, June 20 - 24, 1993.

Payne, S.M., 1994, Implementing Accelerated Cleanup on Large Multiple-Site Projects. The Proceedings of the NWWA Eighth Annual National Outdoor Action Conference, May 23 - 25, 1994. S. Payne presentation speaker at conference.

Payne, S.M., 1997, Integrating Technical Decision-making and Environmental Leadership. HazWaste World Superfund XVIII December 2 - 5, 1997 Conference Proceedings, Washington DC.

Payne, S.M., 1997, *Strategies for Accelerating Cleanup at Toxic Waste Sites*. Lewis Publishers/CRC Press, NY, December.

Payne, S.M. 2001, Nutrient Reduction in the Flathead Basin. October, AWRA Conference, Missoula, MT

Payne, S.M., 2003, A Groundwater Classification System for Watershed Planning and Conservation of Ecotones in Basin Fill Sediments of the Rocky Mountain West, Poster Presentation, Montana Chapter AWAR Annual Conference, Butte, MT, October.

Payne, S.M. and Holston, M. 2000, Overview of the Flathead Lake Voluntary Nutrient Reduction Strategy (VNRS). Clark Fork Symposium 2000 Posters, Missoula, MT.

Reiten, J.C. and Payne, S.M. 1991. Impacts of Oil Field Wastes on Soil and Groundwater in Richland County, Montana. Part III. Montana Bureau of Mines and Geology, Open File Rept. 237-C.

Woessner, W.W., Lazuk R., Payne S.M., 1989, Characterization of Aquifer Heterogeneities using EM and Surface Electrical Resistivity Surveys at the Lubrecht Experimental Forest, Western Montana. The Proceedings of the NWWA Third Annual National Outdoor Action Conference, May 22 - 25, 1989. S. Payne presentation speaker at conference.

IAN A. MAGRUDER

KirK Engineering & Natural Resources, Inc.

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ian_magruder@kirkenr.com

TECHNICAL SPECIALTIES

Hydrogeology/hydrology
Numerical groundwater modeling
Geochemistry of water and sediment/soil
Geographic Information Systems - ArcGIS
Geodatabase development and management
Geophysical techniques for aquifer characterization
River/stream/riparian restoration
Ecosystem modeling
Water quality and biological sampling and analysis
Watershed/riparian assessment

INDUSTRY EXPERTISE

Water resource management
Hydrological/hydrogeological investigations
Water rights permitting
Subdivision water supply and wastewater permitting
Baseline watershed assessment
Superfund technical assistance
Forest stewardship technical writing;
USFS project planning

GENERAL EXPERIENCE

Mr. Magruder has 8 years professional experience in environmental consulting in Montana including extensive project management, research and field data collection, data analysis, and reporting. Environmental investigation fieldwork Mr. Magruder has performed includes water quality sampling, field chemistry, Rosgen surveys, flow and seepage measurement, and physical assessments of riparian health. Mr. Magruder has written watershed baseline data reports, hydrogeological investigations, as well as natural and cultural resource landscape scale assessments.

Mr. Magruder serves as lead of GIS services for KirK Engineering. He has extensive experience managing large databases in GIS including water quality, hydrogeologic, forest health, and other data. Mr. Magruder provides an expert ability to interface GIS vector and raster data with MODFLOW groundwater flow and Biome-BGC ecosystem process modeling applications.

Mr. Magruder has a strong background in numerical groundwater flow modeling and formerly studied under one of the industry's leading author of applied groundwater modeling techniques. Mr. Magruder's experience includes developing a basin scale groundwater-surface water interaction model capable of evaluating effects of land and water management on river flows. Other models developed by Mr. Magruder have been used for water rights permitting, subdivision review, geochemical transport of buried mine waste, and hydrogeological research.

Mr. Magruder has served as a Superfund technical advisor and has evaluated the risks inherent in mine waste and wood treatment chemicals to human and biological receptors. His experience includes review of EPA risk assessment, feasibility, remedial investigation, and remedial action plans. Through his investigations, Mr. Magruder has recognized contaminant pathways and human and biological risks which were not identified by other federal or private studies. Efforts also include creating educational documents and presentations for the public, radio and

newspaper interviews, and public surveying concerning the risks associated with hazardous waste.

Mr. Magruder has a broad interdisciplinary knowledge of the sciences with graduate level coursework and research in geology, hydrogeology, geochemistry, geophysics, geographic information systems, and ecosystem analysis.

SELECTED PROJECTS AND EXPERIENCE

- For the WRC and the Mile High Conservation District, Mr. Magruder produced a physical, biological, and chemical assessment of Browns Gulch near Ramsey, Montana. This baseline watershed assessment involved collection of hydrologic, water quality, fishery genetic, invasive plant, and riparian health data. Mr. Magruder was the lead author of the assessment document which provides a strategy for watershed restoration including a comparison of alternative projects.
- For the Beaverhead Watershed Committee and Beaverhead Conservation District, Mr. Magruder provided water quality, stream channel morphologic, and riparian health assessment in support of the Beaverhead TMDL. One of the products of this effort was a database compliant with MT DEQ standards of all existing water quality, biotic, riparian, and stream health data. Mr. Magruder provided analysis of reference conditions for channel morphology and sediment in support of this TMDL.
- For the Ruby Watershed Council (RWC) and Ruby Valley Conservation District (RVCD), Mr. Magruder has provided hydrogeological services in support of the Lower Ruby Valley Groundwater Management Plan. Mr. Magruder currently serves as project manager under a Montana DEQ Nonpoint Source Program 319 Grant for Groundwater. His responsibilities include field data collection, GIS, data analysis, groundwater modeling, and project reporting. As part of this project, Mr. Magruder developed a basin scale groundwater model with explicit routing of surface water flow. The model is capable of quantifying the current connection between irrigation water management, groundwater, and stream and river flows and is also capable of predicting future management effects on these resources. On behalf of the RWC, Mr. Magruder has presented the findings of this important study to numerous water users and watershed councils.
- For the Watershed Restoration Coalition of the Upper Clark Fork (WRC) and Deer Lodge Conservation District (DLCD), Mr. Magruder is project manager of an effort to develop a landscape scale assessment for the East Deer Lodge Valley in support of forest stewardship contracting on National Forest lands. This assessment is a multidisciplinary effort to evaluate natural and cultural resources on the Beaverhead-Deerlodge National Forest and to develop opportunities to better manage these resources. Mr. Magruder has provided data archive research, analysis and reporting for soils, geologic, watershed,

aquatic life, timber and range, wildlife, recreation and cultural resources. As part of this, Mr. Magruder has provided a large scale GIS database and maps of existing resource condition and has been lead author of the assessment document. This project has required coordination of a diverse interest group including conservation organizations, timber industry, and agency representatives as well as an in-depth knowledge of Forest Service policy.

- Mr. Magruder has provided water rights permitting and assistance for a diverse clientele in Montana. Services include groundwater exploration and hydrogeological investigation for agricultural producers and municipalities as well as MT DNRC permitting and basin closure compliance documentation. Mr. Magruder has provided expert consultation on mitigation planning in support of recent water right legislation in Montana. He has also served subdivision, domestic, and stock water right permitting needs throughout Western Montana.
- Mr. Magruder has provided aquifer testing and water supply assessment for numerous subdivisions in Montana. Mr. Magruder is familiar with current MT DEQ regulatory requirements for water supply and wastewater permitting. He has provided Source Water Delineation and Assessment Reporting (SWDAR) to comply with DEQ source water protection requirements.
- Mr. Magruder provides technical assistance to the citizens Superfund group Citizens Technical Environmental Committee (CTEC) in Butte, Montana. Mr. Magruder provides broad-based scientific expertise to better understanding mine waste and wood treatment chemical hazards associated with the Silver Bow Creek / Butte Area and Montana Pole and Treating Plant Superfund sites in the Upper Clark Fork River Basin. Mr. Magruder reviews CERCLA documents and provides analysis of biological, aqueous and sediment chemistry, hydrologic, hydrogeologic, and air quality data with the intent of identifying risks to the public and the environment. Products of this risk analysis include technical comments to EPA and potentially responsible parties, presentation of findings to public groups and the Butte-Silver Bow Council of commissioners, as well as facilitation between public and state/federal agencies and potentially responsible parties.
- For the Montana Bureau of Mines and Geology (MBMG), Mr. Magruder provided groundwater characterization in support of a study investigating loading of the herbicide imazamethabenz-methyl to drinking water supplies. Research included analysis of aquifer recharge and leaching by different irrigation types in use on the Greenfields Bench, Montana and sampling for imazamethabenz-methyl and its acid metabolite in soil and groundwater.
- For the MBMG, Mr. Magruder investigated the surface and groundwater resources for the Sage Creek Watershed, Montana in support of a study of salt loading to groundwater and streams from agricultural practices in conjunction with development of TMDL for salinity. Products of this research were water quality databases of surface water, shallow

and deep aquifers, watershed scale groundwater flow maps, mapping of groundwater seeps, and characterization of the chemistry of aquifers at different depths.

EMPLOYMENT HISTORY

KirK Engineering & Natural Resources, Inc., Senior Hydrogeologist/GIS Specialist, September 2002-Present

Contract Consultant in hydrological/hydrogeological investigations and watershed assessment, March-September 2002

Montana Bureau of Mines and Geology Research Hydrology Division, Research Specialist II, 2001

Contract Hydrogeologist for the Ruby Valley Conservation District, 2000

EDUCATION/TRAINING

M.S., Geology (hydrogeology emphasis). University of Montana, Missoula, Montana, 2006.

B.A., Geology with High Honors (environmental geology emphasis). University of Montana, Missoula, Montana, 1998.

Hansen Lotic Wetland Health Assessment Training, BRI training 2002.

Proper Functioning Condition Riparian Assessment, NRCS training 2002.

GIS graduate coursework, University of Montana, 2001-2003.

AFFILIATIONS AND COMMUNITY SERVICE

Missoula County Water Quality Advisory Council – Citizen Member, 2006 to present.

Resumes of Gateway Project Staff

It is proposed that the following two members of the Gateway Engineering & Surveying, Inc. staff will be responsible for work completed on this project. Gateway will protect the time of these two individuals to assure that they can individually put the required time into the project. Less experienced staff will not be substituted to complete the work. The resumes of each follow:

Lewis Burton, PE

Principal Civil Engineer

REGISTRATION

Professional Engineer, Montana, Idaho, Washington, Alaska

EDUCATION

BSCE 1970, University of Idaho

Graduate Work, 1979-1981, Geotechnical Engineering and Stream Mechanics, University of Texas/Arlington

ORGANIZATIONS

American Society of Civil Engineers, Associate Member

PROFESSIONAL HISTORY

Gateway Engineering & Surveying, Inc., Bozeman., MT, 2003 - present.

Planning, design, and construction management of a variety of engineering projects including subdivisions, commercial developments, public water and wastewater systems, stormwater management, and a variety of water resource projects.

Lewis Burton & Associates, Belgrade, MT, 1994 - 2003. Complete planning, design, and construction management of a variety of engineering projects including subdivisions, commercial developments, public water and wastewater systems, stormwater management, and a variety of water resource projects.

USDA Soil Conservation Service, 1966 - 1994. Included a wide variety of engineering assignments in various locations. Work included planning, design, and construction management of irrigation systems and structures, dams, channels, pipelines, river and stream bank protection projects, stock water systems, animal waste systems, recreation developments, and mine reclamation projects. Work included broad based planning activities such as development of watershed projects and river basin studies.

State Conservation Engineer, Anchorage, AK, 1991 - 1994. Responsible for managing SCS engineering and water resources programs in the state of Alaska.

The work included construction management of large projects installed under difficult working conditions. Projects included large hydraulic structures, dams, channels, pipelines, and riverbank stabilization projects. Responsibilities included working with native villages and state and federal personnel.

State Design Engineer, Bozeman, MT, 1981 - 1991. Responsible for managing the design program, completing designs, and reviewing designs and project proposals completed by others for various large projects undertaken by the agency. Also provided management and assistance to staff during the construction of projects. Projects were completed with federal, state, and local funding that required approval by various agencies and organizations.

Civil Engineer, Fort Worth, TX, 1978 - 1981.

Responsible for managing the design program, completing designs, and reviewing designs and project proposals completed by others for various large projects being undertaken by the agency. Also provided management and assistance to staff during the construction of projects. Projects included work being completed with federal, state, and local funding and required approval by various agencies & organizations.

Civil Engineer, Lashkar Gah, Afghanistan, 1975 - 1978. Work included development of a project plan and funding proposal for a project to reclaim non-productive saline land in a large irrigated agriculture area in the country. Early phases of project design and construction were also completed during this period. Project plan and funding proposal had to be reviewed and accepted by the United States government and the Afghan government.

Civil Engineer, Phoenix, AZ, 1972 - 1975. Completed planning and design assignments for various engineering projects throughout Arizona. Projects primarily included dams, flood channels, and irrigation systems.

Civil Engineer, Boise, ID, 1970 - 1972. Completed all phases of various civil engineering projects in Idaho.

Engineering Technician, Idaho, 1966 - 1970. Completed technician level projects and engineering trainee assignments at various locations in Idaho.

TYPICAL PROJECTS

Following are examples of projects completed by Mr. Burton during his career:

Dick Creek Diversion Structure: Completion of design revisions and construction management of a diversion and fish screen structure required to divert water out of Dick Creek to provide irrigation water for a group of landowners. Completed as part of a project sponsored by Trout Unlimited.

Bitter Root Irrigation District Siphon No 1 Preliminary Engineering Report: Completion of a preliminary engineering report for the repair and replacement of a large steel pipe siphon on the BRID canal system.

Lazyman Creek Irrigation System Rehabilitation Project, Madison County, MT. Completion of design and construction management of revisions to an irrigation delivery system designed to allow more water to remain in the Lazyman Creek system in order to improve fish habitat. Work included three diversion structures, improvements to the delivery ditches and installation of a pipeline delivery system to reduce erosion to one field.

Lower Birch Creek Watershed Project, Pondera County, Montana. Planning and design work to rehabilitate the canal system for the Pondera County Canal & Reservoir Company. The work included replacement of deteriorated structures, repair of seepage areas, replacement of pipelines, installation of linings, etc. and other measures required to rehabilitate the Pondera County Canal and Reservoir Company system. Work also included overall management of construction operations.

Hammond Canal Company, Forsyth, Montana. Preliminary planning for possible rehabilitation of the canal system. Included identification of seepage areas and other problems with the canal and a determination of possible improvements.

Mill Creek Watershed Project, Park County, Montana. Planning and design of a three-mile long channel and series of three gravity pressure pipelines to provide water to a large area of sprinkler irrigated land. The project included a diversion structure and pipeline out of Mill Creek to deliver water to the system.

Canyon Lake and Wyant Lake Dam. Completion of feasibility study and DNRC application for renewable resource grant funding for rehabilitation of dams.

Renewable Resource Grant Reviews. Completed technical reviews of renewable resource grant applications for DNRC for the 2002 funding cycle.

Sun River Valley Diversion, Cascade County, Montana. Design, design review, permit applications, development of construction contract and construction management of a project consisting of a reinforced concrete diversion structure on the Sun River to divert flow into the Sun River Valley Irrigation Co. ditch.

Beck Border Ditch Co. Diversion, Gallatin County, Montana. Planning and preliminary design of system to redirect the Gallatin River to an old river channel where an existing diversion structure is located. Develop permit applications. Assistance in working with adjacent landowners, the Corps of Engineers and others in reaching a mutually satisfactory solution to the problem. Also worked with the ditch company to evaluate needs for culvert sizes and other problems on the canal system.

Whitehorse Canal Diversion Structure Rehabilitation. Complete design and construction management for the rehabilitation of a large diversion structure for the canal head gate. Included request for permits, etc.

Dam Safety Inspections, Montana. Has completed a variety of safety inspections in Montana for high hazard dams.

City of Eagle Sheet Pile Retaining Wall, Eagle, AK. Planning and design of sheet pile wall on the Yukon River adjacent to the City of Eagle, AK.

Fort Yukon Erosion Control Project, Fort Yukon, AK. Planning, design, and construction management of an erosion control project on the Yukon River at Fort Yukon, AK.

Bull Wheel Ranch, Ennis, MT. Design and construction management of a public water system for Bull Wheel Ranch subdivision.

East Bench Irrigation District, Dillon, MT. Planning and design of canal structures and gravity pressure pipeline systems for sprinkler irrigation.

Three Mile RC & D Project: Planning, design, and construction Management of a series of gravity pressure pipeline systems to provide water to sprinkler irrigated cropland.

Merlin Nelson, PE

Water Resource Engineer

REGISTRATION

Professional Engineer, Montana

EDUCATION

BSAE 1971, University of Minnesota

ORGANIZATIONS

American Society of Agricultural Engineers

PROFESSIONAL HISTORY

Gateway Engineering & Surveying, Inc., Bozeman, MT, 2005 to present.

Specializes in the planning, design, and construction management of agricultural engineering and water resource projects including animal waste management, irrigation systems, streambank stabilization and water rights issues.

NRCS, Bozeman, MT, 1995 - 2005. State Agricultural Engineer with responsibilities including irrigation and water management duties both statewide and in the seven state Northern Plains region. Regional duties included leadership of the irrigation team for development of several national engineering standards, and state standard templates for the Northern Plains Region. Additionally assumed the agricultural waste management duties in 1998. Responsible for the revision of the majority of the current Montana NRCS engineering standards. The duties in this final position were the same as the previous Assistant State Conservation Engineer prior to 1995, as well as acting for the State Conservation Engineer in his absence or assignment.

Agricultural Engineer, Billings, MT, 1978 - 1995. This position included expanding responsibilities throughout these years for planning, survey, hydraulic, structural and geomorphic design of various types of projects throughout much of south central and eastern Montana. Projects during the earlier years were mostly related to irrigation pipelines, drainage and canal structures and in later years expanded to include stream restoration and agricultural waste management.

Project Engineer, Billings, MT, 1976 - 1978. Project Construction Engineer for a large dam and channel flood control project, two large irrigation siphons and four large stream bank erosion projects.

Civil Engineer, Brooklyn Center, MN, 1973 -1976. Completed planning and design for urban erosion control, agricultural waste management, small dam and drainage projects in a twelve county area.

Agricultural Engineer, Alexandria, MN, 1971 - 1973. The first graduate engineering position performing survey, design and construction of erosion control projects, stream bank protection work, small dam and grade stabilization structures.

SCS Engineering Intern, Cooperative Education with University of Minnesota, St. Peter and St Paul, MN, 1967-1971. Basic technician and intern engineer level survey, design and construction of smaller on-farm conservation practices.

TYPICAL PROJECTS

Canal linings:

PVC – (Polyvinyl chloride); HDPE (High Density Polyethylene); EPDM rubber liners; polyurethane elastomer (manufacture on-site) liners; as well as reinforced and non-reinforced concrete, applied to ditches from field laterals to 400+ C.F.S. canals.

Projects include:

Pondera County Canal & Reservoir Company - Lower Birch Creek Watershed
Cove Ditch, Stillwater County
Kughen Ditch, Gallatin County
Buffalo Rapids, Dawson County

Irrigation Canal Structures:

Siphons (inverted) up to 96 inch diameter and lengths to over 1300 feet; headgates, and wasteways on canals with capacity up to 400 C.F.S.

Projects include:

Billings Bench Water Users Canal – Yellowstone County
Two Leggins Canal – Big Horn County
Bridger Canal – Carbon County
Yellowstone Irrigation District – Treasure County

Stock Water and Irrigation Dams:

Irrigation Dams (up to 150 Acre-Foot usable irrigation water storage) survey, design, & construction.

Stream Restorations:

Bendway weirs on Yellowstone and Clark Fork Rivers, stream vanes (barbs and sills), root wads, wattles etc. applied on various small stream applications. Also included are traditional gabion and rock rip-rap applications in limited space conditions.

Animal Waste Management:

Survey, design, peer review, and construction of storage tanks, holding ponds, pits settlement basins and treatment strips for small farm units to feedlots of over 3,000 animals.

Other:

Support activities for the above such as pipelines, soil mechanics, drainage hydrology and hydraulics. Technical presentations on the above subjects were given at professional societies, industry, and University conferences.

Floodplain Investigation:

Floodplain investigation and determination of potential flood impacts have been developed for properties with and without FEMA regulatory data.

Projects include:

Dave Simeone Minor Subdivision, Gallatin County, MT.
Damon Peary Homesite, Gallatin County, MT.
Middle Creek Parklands, Bozeman, MT.
Morgan Septic Design, Logan, MT.
Van Orden Family Transfer, Gallatin County, MT.

Site Planning:

Site investigations and site planning for commercial and private property were made including hydrology, runoff retention system planning, wastewater treatment systems; both gravity and pressurized, as well as construction layout and inspection.

Projects include:

Bull Wheel Ranch Subdivision Water System, Ennis, MT.
Bloom Septic System, Gallatin County, MT.
Cougar Park Commercial Development, Bozeman, MT.
Henry Glen Homesite, Gallatin County, MT.
Shadow Ridge Major Subdivision, Madison County, MT.
VanderMolen Family Transfer, Amsterdam, MT.

TSP Irrigation Projects:

As a Technical Service Provider in partnership with AquaTech Irrigation of Belgrade, Billings, and Dillon, Montana, various project designs and reviews are performed for landowners who contract with the USDA for Conservation Irrigation Projects on their land.

Projects include:

Brad Kinsey Pivot Irrigation Project, Musselshell County, MT.
Johnson Pivot Irrigation Project, Jefferson County, MT.
Green Lateral Canal – Pipeline Replacement, Gallatin County, MT.

EDUCATION

1962-1966 Bachelor of Science degree in fish and Wildlife management, Utah State University.

1966-1968 U.S. Army medical corps.

1968-1970 Master of Science degree in fish and wildlife management (emphasis in fisheries management)
Montana State University.

WORK EXPERIENCE

1998 – Present self employed natural resource consultant.

Contracts with Upper Clark Fork Steering Committee, Trout Unlimited, Fish, Wildlife and Parks, Hydrodynamics. Working on instream flows for the upper Clark Fork River and Warm Springs Creek, monitoring fish populations and habitat in Warm Springs Creek, assess fish populations in Flint Creek below Georgetown Lake, assessing trout habitat in high priority tributaries to the Clark Fork between Milltown and Garrison for the Natural Resource Damage Program.

Retired January 1998 after 27 years with Montana Department of Fish, Wildlife and Parks

1979-1997 Region 2 Fish Manager, Montana Department of Fish, Wildlife and Parks, Missoula, Montana.

Responsible for sport fisheries management in all state waters in the Clark Fork River basin from headwaters to the confluence of the Flathead River. Our primary mission was to produce high quality wild trout fisheries through habitat conservation, water quality protection, and setting of seasons, creel limits and other regulations.

1975-1979 Region 4/6 Parks Manager, Montana Department of Fish, Wildlife and Parks, Great Falls, Montana.

Responsible for managing all parks, fishing access sites and natural areas in the north half of Montana east of the Continental Divide. Our mission was to facilitate public use on Department managed sites while maintaining good relations with neighboring landowners and maintaining fish and wildlife habitat.

1971-1975 Project Fisheries Biologist, Montana Department of Fish, Wildlife and Parks, Livingston, Montana.

Responsible for fisheries management in the Yellowstone River basin from Yellowstone Park to Big Timber. My primary mission was to monitor fish populations in the rivers, creeks and lakes within the basin, protect water quality and habitat and recommend fish regulations as needed.

RANKIN HOLMES

Education

M. A. – Dept. of Geography – University of Montana - Geographic Information Systems (GIS)/ Land Use Planning - 2007

B. S. – College of Forestry and Conservation – University of Montana - Natural Resource Management – 1997

Work Experience

June 2006 – Present Montana Water Trust – Project Manager
www.montanawatertrust.org

- Manage water leasing contracts for instream flows for fisheries; legally protect water instream through change of use process
- negotiate contracts and economic evaluations of water rights
- Duties include biological assessments, field/stream monitoring of water lease projects, data collection and analysis
- List of current Montana Water Trust projects attached

Spring Semester annually - Present University of Montana, Missoula – Adjunct Professor –
Department of Geography

- Geog 385 – Field Techniques - Instruct field surveying, data design, field statistics, implementation of environmental monitoring, GPS Differential Corrections , Total Station/Theodolite surveying, other necessary skills

Dec. 2003 – June 2006 Big Sky Conservation Institute – Co-Director and GIS Analyst
www.bigsky.org

- * Directed and managed the BSCI GIS Lab, overseeing projects for two dozen non-governmental organizations, agencies and scientist throughout the northern rocky mountain region. Responsibilities include GIS Analysis, Developing Internet Map Services, Remote Sensing, Cartographic production for publications and network administration, data collection and data management
- * Direct and manage BSCI's International Program which conducted numerous GIS Training seminars throughout the former Soviet Union and central Asia. Coordinated the GIS Scholar program which allows foreign researchers to travel to the United States for GIS and conservation training and planning
- * Managed and assisted with all aspects of grant writing and organizational administrative work and reporting

RANKIN HOLMES

Autumn Semester 2003

University of Montana, Western – Adjunct Professor
Environmental Sciences

- Instructed Geographic Information Systems GIS using ESRI's ArcGIS – ArcInfo. Taught GIS techniques, cartographic design, building and developing geo- databases and imagery rectification.

Past Projects and GIS Instruction

- 2004 - 2005 - Lolo Creek Watershed Analysis – U.S. Forest Service - GIS Project Manager working with Montana Trout Inc.
- 2004 - 2005 - Coordinated and conducted two GIS training seminars in the Altai Republic and Sverdlovskaya Oblast (Ural Mountains), Russia.
- 2004 - 2005 - Coordinated and conducted two GIS training seminars Ulaangom and Olgii, Mongolia.
- 2004 - 2005 - Coordinated and conducted vegetation sampling for classifying satellite imagery for Change detection and classification analysis using LandSat data in Mongolia.
- 2003 - 2004 - State of the Clark Fork Report – Clark Fork Coalition – GIS Manager - Extensive census data and environmental indicators mapped throughout the watershed.

Software Training Certificates

ESRI Inc. – Instructor Led Trainings – Building Geodatabases I, Intro to ArcGIS I, Intro to ArcGIS II, Spatial Analyst and Intro to Geoprocessing with Python Scripts

ESRI Inc. – Online Courses - Learning ArcIMS, Customizing ArcIMS , Learning ArcGIS 9.x, Spatial Analyst, and Whats New in ArcInfo 8.x

Software Experience

- Environmental Systems Research Institute Inc. (ESRI)- GIS Softwares: ArcInfo 9.x
- Spatial Analyst, 3D Analyst, ArcScan, ArcPress, Arcview 3.x, ArcIMS 9.x
- Leica Geosystems – Erdas Imagine 8.7
- Adobe Software Products - Illustrator, Photoshop, Pagemaker, GoLive
- Microsoft Office - Word, Excel, Powerpoint, Access